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OCCUPATION MORTALITY STATISTICS OF SHEFFIELD, ENGLAND, 1890-1907.

By F. S. Crum.

The annual reports of the Medical Officer of Health of Sheffield, England, have long been of special interest and value because they have contained occupation mortality data. This fact in itself is sufficient to mark the reports as being unique, for mortality by occupation is very rarely included in the health reports of England or any other country. Sheffield being an important centre for the manufacture of cutlery and files, many men are employed there as cutlers, grinders, toolmakers, file-makers, etc., and the occupation statistics are of special value because they throw considerable light upon certain trades which are health-injurious.

The present report, like those for many previous years, contains the tabulated mortality returns for all of the important occupations. The industries of special importance, however, are those already specifically mentioned. The following table found on page xi of the report for 1907 will indicate in a rough way the effect of certain occupations on mortality, and particularly their effect on the mortality from certain causes of death:—

AVERAGE MORTALITY IN SHEFFIELD FROM ALL CAUSES AND FROM PHTHISIS AND DISEASES OF THE RESPIRATORY ORGANS DURING THE THREE YEARS, 1905, 1906, AND 1907, IN CERTAIN DUSTY TRADES, AND AMONG ALL MALES OVER TWENTY YEARS OF AGE.

Trade.	Males over 20 Years of Age. (Estimated Population.)	Average Death-rates per 1,000 Living.		
		All Causes.	Phthisis.	Respiratory Diseases.
Grinders	3,375	34.2	16.3	5.7
Cutlers	2,500	40.8	7.2	8.4
File-cutters	1,850	32.1	4.5	5.4
Silver, etc., Workers . . .	2,380	26.9	5.5	4.9
All Males	127,000	16.2	2.6	2.1

This table would have been more useful if it had been given by divisional periods of life, but even in its present form it is suggestive of the baneful effect on health of certain trades which expose the workmen to mineral and metallic dust. The mortality rate from all causes is shown to have been more than double the expected rate for grinders and cutlers, and excessive for file-cutters and other metal-goods workers. The mortality from phthisis was more than six times as high for grinders as for all males, and very much in excess also among the other metal workers. The mortality from respiratory diseases was four times as high for cutlers as for all occupied males, and considerably in excess among other metal workers.

Unfortunately, the number of persons employed in the various trades peculiar to Sheffield are not available by divisional periods of life, and it is therefore impossible to calculate death-rates by age groups. The mortality returns, however, are given by age groups and by principal causes of death, and a study of these statistics can be made in such a manner as to show the proportion which certain causes of death bear to the mortality from all causes at various divisional periods of life. This method, when used in a comparative way, is very suggestive and perhaps quite as determining for certain purposes as death-rates per 1,000 living.

In the following tables a summary is presented of the statistics of four typical trades—grinders, cutlers, tool-makers, and file-cutters—for the eighteen-year period 1890–1907, for the purpose of showing whether or not there has been any improvement in the mortality from phthisis and respiratory diseases of the workmen in the trades specified:—

I. PROPORTIONATE MORTALITY OF ***GRINDERS*** FROM PHTHISIS AND RESPIRATORY DISEASES IN SHEFFIELD, 1890–1907.

Ages.	Number of Deaths from						Percentage of Mortality from Phthisis.		
	All Causes.			Phthisis.					
	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.
Under 25	34	23	22	14	8	12	41.2	34.8	54.5
25–34	88	69	86	43	29	61	48.9	42.0	70.9
35–44	137	142	143	72	80	93	52.6	56.3	65.0
45–54	201	183	189	78	82	106	38.8	44.8	56.1
55–64	130	163	162	31	45	66	23.8	27.6	40.7
65 and over	90	80	107	8	7	14	8.9	8.8	13.1

Ages.	Number of Deaths from Respiratory Diseases.			Percentage of Mortality from					
				Respiratory Diseases.			Phthisis and Respiratory Diseases.		
	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.
Under 25	10	5	4	29.4	21.7	18.2	70.6	56.5	72.7
25–34	22	13	7	25.0	18.8	8.1	73.9	60.9	79.1
35–44	27	29	15	19.7	20.4	10.5	72.3	76.8	75.5
45–54	70	47	32	34.8	25.7	16.9	73.6	70.5	73.0
55–64	61	61	43	46.9	37.4	26.5	70.8	65.0	67.3
65 and over	39	29	25	43.3	36.3	23.4	52.2	45.0	36.4

II. PROPORTIONATE MORTALITY OF *CUTLERS** FROM PHTHISIS AND RESPIRATORY DISEASES, SHEFFIELD, 1890–1907.

Ages.	Number of Deaths from						Percentage of Mortality from Phthisis.		
	All Causes.			Phthisis.					
	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.
Under 25	52	36	22	26	16	9	50.0	44.4	40.9
25–34	62	49	40	30	27	20	48.4	55.1	50.0
35–44	145	85	74	52	32	30	35.9	37.6	40.5
45–54	141	146	120	22	39	31	15.6	26.7	25.8
55–64	193	183	154	21	22	22	10.9	12.0	14.7
65 and over	327	204	226	3	8	10	0.9	3.9	4.4

Ages.	Number of Deaths from Respiratory Diseases.			Percentage of Mortality from					
				Respiratory Diseases.			Phthisis and Respiratory Diseases.		
	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.
Under 25	8	11	6	15.4	30.6	27.3	65.4	75.0	68.2
25–34	12	4	9	19.4	8.2	22.5	67.7	63.3	72.5
35–44	37	20	9	25.5	23.5	12.2	61.4	61.2	52.7
45–54	54	39	27	38.3	26.7	22.5	53.9	53.4	48.3
55–64	82	48	35	42.5	26.2	22.7	53.4	38.3	37.0
65 and over	117	50	58	35.8	24.5	25.7	36.7	28.4	30.1

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* "The term cutler has not, in Sheffield, the meaning popularly given it; that of a maker of scissors, forks, razors, and other small cutting utensils. Such a one is a dry grinder; whereas a cutler is one who makes heavier goods, edge-tools, saws and scythes, all of which are wet ground." (Arlidge, "Diseases of Occupation," p. 341.)

"The baneful tendency of the trade [grinding] is not confined to dry grinding; the position in which the artisans work is exceedingly unfavorable to the action of the lungs, the upper half of the body being constantly bent forward over the revolving stone; and in the branches in which dry grinding is not used, the articles, such as saws, scythes and edge tools, are heavy, demanding great muscular exertion. Independently, however, of the bodily exhaustion which is occasioned, the grinders are exceedingly subject to acute inflammatory diseases from the exposed situations in which they work." (Holland, "The Vital Statistics of Sheffield," p. 115.)

III. PROPORTIONATE MORTALITY OF ***TOOL-MAKERS*** FROM PHTHISIS AND RESPIRATORY DISEASES, SHEFFIELD, 1890–1907.

Ages.	Number of Deaths from						Percentage of Mortality from Phthisis.		
	All Causes.			Phthisis.					
	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.
Under 25	22	31	27	12	12	7	54.5	38.7	25.9
25–34	38	52	61	16	20	30	42.1	38.5	49.2
35–44	65	70	85	26	26	32	40.0	37.1	37.6
45–54	104	126	135	18	26	36	17.3	20.6	26.7
55–64	134	152	182	14	19	30	10.4	12.5	16.5
65 and over	180	246	333	5	2	8	2.8	0.8	2.4

Ages.	Number of Deaths from Respiratory Diseases.			Percentage of Mortality from					
				Respiratory Diseases.			Phthisis and Respiratory Diseases.		
	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.
Under 25	5	5	4	22.7	16.1	14.8	77.3	54.8	40.7
25–34	3	10	7	7.9	19.2	11.5	50.0	57.7	60.7
35–44	15	7	15	23.1	10.0	17.6	63.1	47.1	55.3
45–54	41	35	25	39.4	27.8	18.5	56.7	48.4	45.2
55–64	53	38	50	39.6	25.0	27.5	50.0	37.5	44.0
65 and over	67	58	90	37.2	23.6	27.0	40.0	24.4	29.4

IV. PROPORTIONATE MORTALITY OF ***FILE-CUTTERS**** FROM PHTHISIS AND RESPIRATORY DISEASES, SHEFFIELD, 1890–1907.

Ages.	Number of Deaths from						Percentage of Mortality from Phthisis.		
	All Causes.			Phthisis.					
	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.
Under 25	24	29	18	8	5	10	33.3	17.2	55.6
25–34	48	39	20	17	17	4	35.4	43.6	20.0
35–44	115	73	68	28	25	22	24.3	34.2	32.4
45–54	152	118	96	30	23	21	19.7	19.5	21.9
55–64	116	133	112	16	13	9	5.2	9.8	8.0
65 and over	119	106	121	2	4	4	1.7	3.8	3.3

Ages.	Number of Deaths from Respiratory Diseases.			Percentage of Mortality from					
				Respiratory Diseases.			Phthisis and Respiratory Diseases.		
	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.	1890–95.	1896–1901.	1902–07.
Under 25	6	8	1	25.0	24.1	5.5	58.3	41.3	61.1
25–34	7	6	3	14.6	15.4	15.0	50.0	59.0	35.0
35–44	24	4	13	20.9	5.5	19.1	45.2	39.7	51.5
45–54	36	21	9	23.7	17.8	9.4	43.4	37.3	31.3
55–64	36	28	16	31.0	21.1	14.3	36.2	30.9	22.3
65 and over	43	23	32	36.1	21.7	26.4	37.8	25.5	29.7

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* File-cutting as carried on in Sheffield in the past by hand methods has exposed the cutters to lead poisoning, or plumbism, to such a degree that this factor alone has called forth many and extended comments by qualified inquirers. These observations have extended over a long period. and have been made by various English authorities, including Drs. Holland, Greenhow, Hall, White, Thomson, Arlidge, Littlejohn, Robertson, Scurfield, Oliver, and others. The subject of lead poisoning in this connection is such a large one that it will be worth while to give it special consideration in a future note.

The figures in Table I. do not indicate that there has been any marked improvement in the mortality from consumption and respiratory diseases among the *grinders* of Sheffield during the period 1890 to 1907. In fact, as a rule with few exceptions, the proportionate mortality from consumption and from consumption and respiratory diseases combined was higher at all ages during the six years 1902–07 than during either of the other six-year periods. On the other hand, the mortality from respiratory diseases, when considered separately, seems to have declined fairly constantly at all ages or divisional periods of life.

Table II. shows that the proportion of the total mortality due to consumption has increased among the *cutlers* of Sheffield at all ages over 25. The proportionate mortality from respiratory diseases has increased at ages under 35 and decreased quite considerably at ages 35 and over. Combining the mortality from consumption and respiratory diseases, the proportionate mortality from the two was higher during the period 1902–07 than during 1890–95 at ages under 35 and lower at ages 35 and over.

The proportionate mortality of *tool-makers* from consumption and respiratory diseases has, on the whole, showed improvement during the eighteen-year period under observation. The age period 25–34 is the only exception when both causes are combined. When consumption only is considered, the improvement was more noteworthy during the period 1896–1901 than during 1902–07. In fact, the proportionate mortality from consumption was lower among tool-makers during 1902–07 than during 1890–95 at ages under 25, 35–44, and 65 and over, and higher at ages 25–34, 45–54, and 55–64.

The proportionate mortality of *file-cutters* has not improved from consumption, but was higher at all ages, except 25–34, during 1902–07 than during 1890–95. On the other hand, there was a quite general improvement in the proportionate mortality from respiratory diseases.

Summarizing the four preceding tables they seem to indicate that, if there has been an improvement in the death-rate from all causes among grinders, cutlers, tool-makers, and file-cutters in Sheffield during 1890–1907, the improvement has not been due to any considerable reduction in the mortality from consumption, or, at any rate, the mortality from consumption has not declined in proportion to all causes, for, as a rule, the proportionate mortality from consumption was higher during 1902–07 than during 1890–95. The apparent general improvement in the mortality from respiratory diseases is quite noticeable in all the tables, and it is possible that in recent years deaths may have been reported as phthisis that would formerly have been reported as bronchitis or some other respiratory disease.

In the following table, comparison is made of the proportionate mortality of grinders, cutlers, tool-makers, and file-cutters from consumption and respiratory diseases. To clearly indicate the excessive mortality in these Sheffield trades from diseases of the lungs and air passages, the corresponding proportionate mortality for all occupied males in England and Wales as reported in the Supplement to the Sixty-fifth Report of the Registrar-General is given in the last column.

COMPARATIVE PROPORTIONATE MORTALITY, SHEFFIELD, ENGLAND, 1902–07.

PHTHISIS.

Ages.	Grinders.	Cutlers.	Tool-makers.	File-cutters.	All Occupied Males, England and Wales, 1900–02.
Under 25 . .	54.5	40.9	25.9	55.6	30.5
25–34 . . .	70.9	50.0	49.2	20.0	33.8
35–44 . . .	65.0	40.5	37.6	32.4	26.9
45–54 . . .	56.1	25.8	26.7	21.9	17.1
55–64 . . .	40.7	14.7	16.5	8.0	7.0
65 and over .	13.1	4.4	2.4	3.3	1.2
RESPIRATORY DISEASES.					
Under 25 . .	18.2	27.3	14.8	5.5	10.5
25–34 . . .	8.1	22.5	11.5	15.0	12.8
35–44 . . .	10.5	12.2	17.6	19.1	16.3
45–54 . . .	16.9	22.5	18.5	9.4	18.7
55–64 . . .	26.5	22.7	27.5	14.3	21.1
65 and over .	23.4	25.7	27.0	26.4	20.1

COMPARATIVE PROPORTIONATE MORTALITY, SHEFFIELD, ENGLAND, 1902–07.

PHTHISIS AND RESPIRATORY DISEASES.

Ages.	Grinders.	Cutlers.	Tool-makers.	File-cutters.	All Occupied Males, England and Wales, 1900–02.
Under 25 . .	72.7	68.2	40.7	61.1	41.0
25–34 . . .	79.1	72.5	60.7	35.0	46.6
35–44 . . .	75.5	52.7	55.3	51.5	43.2
45–54 . . .	73.0	48.3	45.2	31.3	35.8
55–64 . . .	67.3	37.0	44.0	22.3	28.1
65 and over .	36.4	30.1	29.4	29.7	21.3

This table requires little comment. It shows that persons employed as grinders, cutlers, tool-makers, and file-cutters, are considerably more liable to death from some disease due to, or accelerated by, dust inhalation than would be expected on the basis of the mortality of all occupied males in England and Wales. The statistics point unmistakably to the causes of the high mortality of these classes or groups of workmen, and they indicate the need of greater precautions and more effective safeguards against the inhalation of the metallic and mineral dusts peculiar to the trades specified.

In conclusion I may again* point out that there are many cities and towns in the United States where one or more industries, more or less hazardous or health-injurious, are centralized. For example: Trenton and Perth Amboy, N.J., and Circleville, Ohio, are pottery centres; Orange, N.J., and Danbury, Conn., are felt-hat making centres; Barre, Vt., among other cities, is a centre for stone-cutting; White Mills, Pa., and Corning, N.Y., for glass-cutting; Amsterdam, Cohoes, and Middletown, N.Y., for the knitting industry; Philadelphia, Pa., for carpet mills; Fall River and New Bedford, Mass., for cotton and woollen textiles; Paterson, N.J., for silk goods; Pittsburg, Pa., for iron and steel products; Minneapolis, Minn., for the flour industry, and Key West, Fla., for the manufacture of cigars and cigarettes. If the local authorities in such cities and towns would evince a willingness and enthusiasm to contribute to the general fund of knowledge of trade diseases and mortality, they would not only perform a really valuable service to their fellow men, but they would at the same time connect their names with investigations similar to those which have contributed greatly to the fame of Ramazzini, Thackrah, Hirt, Farr, Arlidge, Oliver, and some others of the select few who have found time to give to the world the results of their inquiries into the effect of certain industries or trades upon the disease liability and mortality of those employed therein. Few, indeed, are the contributions which have been made along these lines by qualified American authorities. It may very properly be said that here is a field where the harvest is full and ripe, but the reapers few.

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* "The Mortality from Consumption in Small Cities," Quarterly Publications of the American Statistical Association, December, 1907.